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Project

Date

Author

TITLE

THE PINE REPRODUCTION WEEVIL

Cylindrocopturus eatoni Buch.

By

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Forest Insect Laboratory
Berkeley 4, California
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History and Distribution

The pine reproduction weevil, while a native insect of California, caused no serious injury in the State until 1939. At that time it was found to be killing ponderosa and Jeffrey pines which had been planted in a large brushfield in northern California. This insect is very restrictive in its range and has been reported only in Madera, Eldorado, Plumas, Shasta, Modoc and Siskiyou Counties in California.

Importance

During the last decade this insect has proven to be a very destructive enemy of young ponderosa and Jeffrey pine, when planted in brushfield areas, being responsible for the almost complete destruction of a 3,000 acre planting in the Big Springs area on the Lassen National Forest, and causing serious damage in several other similar plantings in northern California. This insect has caused considerable damage to species of pines and their hybrids at the Institute of Forest Genetics at Placerville. It has also caused some damage to natural reproduction on burned areas and along roadsides in California (Fig. 1). It is a killer of juvenile trees and seems to prefer trees from about eighteen inches to three feet in height, but has occasionally been found attacking planted trees up to ten feet in height.

Host Trees

Under natural forest conditions only the two pines, ponderosa, Pinus ponderosa Laws., and Jeffrey, P. jeffreyi Grev. and Balf., are attacked and killed. Under planted conditions at the Institute of Forest Genetics the following species and species hybrids have been attacked and killed: P. ponderosa var. scopulorum Engelm., P. taeda L., P. sylvestris L., P. montana, P. rigida \times taeda, P. echinata \times rigida, P. monticola \times strobos, and P. jeffreyi \times coulteri.

Life History and Habits

The life cycle of the reproduction weevil is shown graphically in Figure 2. Emergence of adult weevils, normally, starts about the last week of May and continues until about mid-July (Fig 2-A), with peak emergence usually about mid-June. Shortly after emergence the weevils mate and start feeding on the pine needles (Fig 2-B and Fig. 3 & 4), twigs, and stem. Feeding continues for a period of about two weeks, after which the female weevils excavate individual egg niches in the outer bark of the main stem and twigs in which a single egg is deposited (Fig. 2-C). These hatch out in about two weeks into small white or cream

colored larvae which chew through the outer bark and continue their mines in the inner portion (Fig. 2-D). They reach full development in the late fall when they construct tunnels in the outer wood and spend the winter as mature larvae in these cells. Late in the following spring they transform to pupae (Fig. 2-E) in which stage they spend about two weeks. They then transform to adults and emerge, thereby completing their one year life cycle. The adult weevil is a small compact active insect about 2.6 mm long by 1.1 mm. wide, clothed with dark and light scales which give it a grey appearance (Fig 4).

Symptoms of Damage

The first evidence of activity in the spring is the presence of feeding punctures in the form of concentric brown rings about 1 mm. in diameter on the needles (Fig 3). Feeding punctures and oviposition niches on the stems and twigs are characterized by the formation of drops of pitch around the affected areas. Some injury may result from heavy feeding by the adults on the needles and outer bark, but serious damage and death to the tree is caused by the feeding of the larvae in the phloem and cambium region which cuts off the translocation of food materials. Evidence of fading of the foliage is not usually apparent until late in September, and some trees, even though they may be killed, will not fade until early the following spring. The work of the pine reproduction weevil is similar in many respects to that of the white pine weevil, Pissodes strobi Peck., except for the fact that the white pine weevil kills the terminal shoot while the reproduction weevil usually kills the whole tree.

23

Control

This insect has several parasitic and predaceous enemies but these seem to be incapable of successfully keeping it in check.

Indications are that available soil moisture is a very important factor in regulating the abundance or scarcity of this insect. Practically all of the serious epidemics in planted areas have been associated with years when soil moisture has been deficient during the spring of the year preceding outbreaks. Intense competition with brush cover for moisture apparently is associated with intensity of damage. Damage on shallow rock outcrops has been found to be greater than in areas where soil depth is adequate.

Recent work at the Institute of Forest Genetics indicates that one of the most promising methods of indirect control may be by plant breeding in developing species and species hybrids which show a high degree of resistance to injury by the weevil.

37

This insect can be successfully controlled in large planted areas through the aerial application of DDT at a cost of about \$1.25 per acre, using the formula of 1 pound of DDT dissolved in one quart of an auxiliary solvent plus enough diesel oil to make one gallon of solution. This should

be applied at the rate of one pound of DDT per acre about the middle of June. Ornamentals or small plantations can be successfully treated by hand using the same formula above applied with a sprayer which will produce a very fine mist. Another method of direct control for these small areas is to reduce the weevil population through the digging and burning of all infested material by about June 1.

References

Eaton, C. B. - 1942. Biology of the Weevil *Cylindrocopturus eatoni* Buch. Injurious to Ponderosa and Jeffrey Pine Reproduction. Journal of Economic Entomology. 35 (1): 20 pp. 20-25

Miller, J. M. 1950. Resistance of Pine Hybrids to the Pine Reproduction weevil. Forest Research Note, No. 68. California Forest & Range Experiment Station, Berkeley, California.



Fig. 1

Natural reproduction of ponderosa pine killed by the pine reproduction weevil on a burn on the Sierra National Forest.

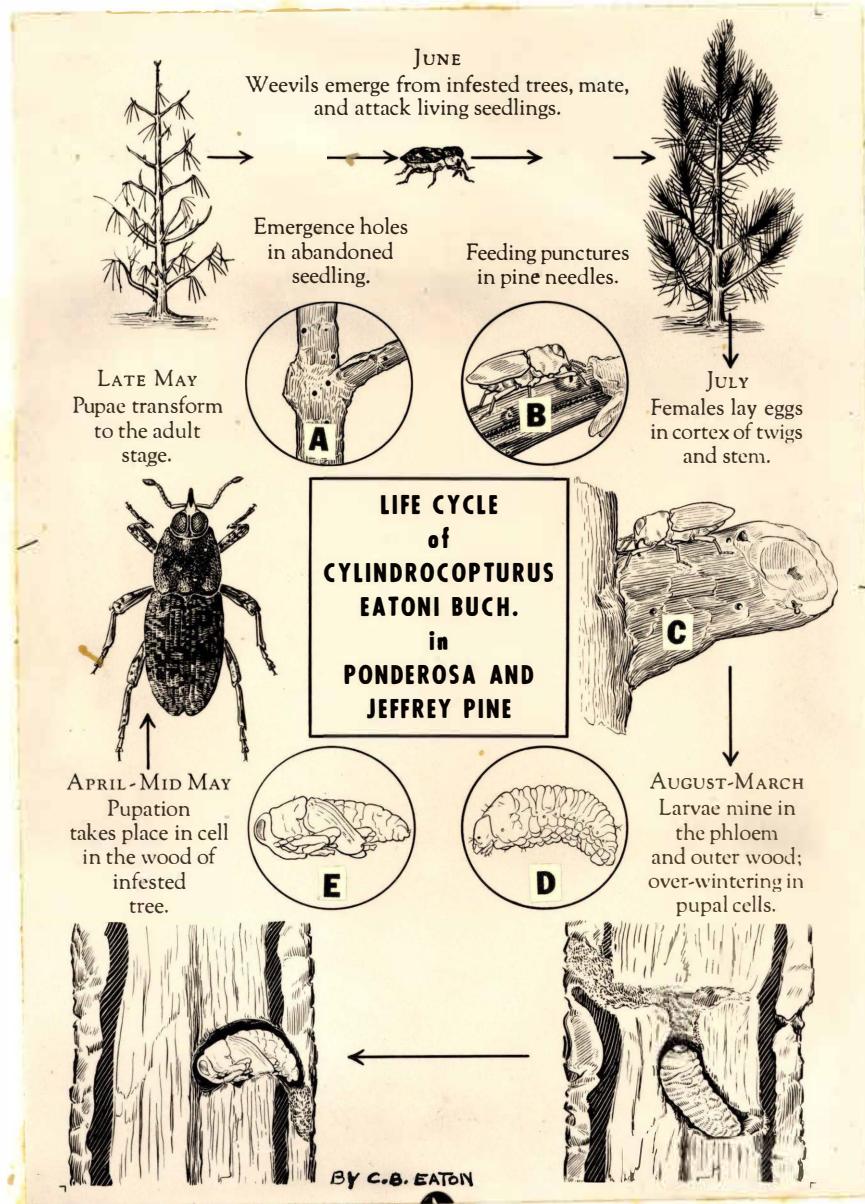


Fig. 2



Fig. 3

Feeding punctures by the adult weevil on the needles of Jeffrey Pine.



Fig. 4

Adult weevil feeding on a ponderosa pine needle. (x 20)